800 profusely illustrated pages dealing with thallophytes. The second volume[8] appeared in 1909, and contained over 900 pages dealing with the "Cormophyta Zoidogamia," which include, of course, the "polyciliate" gymnosperms. A third huge volume has now appeared,[9] containing over 1000 pages and representing only the first part on "Cormophyta Siphonogamia." The most impressive fact is the publication, within four years, of nearly 2800 pages, which demanded the traversing of an extensive range of literature for the compilation of facts and illustrations.

The present volume deals with Coniferales, Gnetales, and a part of the Angiosperms. There is no occasion for a detailed review, since the volume is an encyclopedia of our present knowledge in reference to these groups, and of the current speculations in reference to their phylogeny. A casual running through the pages indicates that the author has brought together a remarkably wide range of literature, has included a large number of illustrations from scattered contributions, and has organized his material in such a way as to make it easily accessible. The work as a whole will put the student in touch with the most important morphological contributions of recent years, and in this way will serve as a condensed library.—J. M. C.

MINOR NOTICES

Warming's Handbuch.—A third German edition of WARMING'S *Handbuch*, revised by MÖBIUS, has just appeared.[10] This text is so familiar that only the new features of the present revision need be noted. The changes concern chiefly the thallophytes, which MÖBIUS says "have diverged farthest from the original Danish conception," and especially the algae, in the presentation of which the new system of WILLE has been adopted. There are minor changes in other parts, such changes as may take advantage of a revision rather than demand it.

Perhaps the most interesting feature of the volume is the table representing the evolution of the plant kingdom, the blocks indicating the great groups, having the appropriate pigment colors. All the groups are definitely related, the plant kingdom arising from the flagellates, which give rise directly and independently to seven groups ("Chytridiaceae, Myxomycetes, Schizomycetes, Volvocaceae, Conjugatae, Diatomaceae, Peridineae"), the first four groups mentioned being responsible for all the rest. Anthocerotaceae are

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[8] See *ibid.* **49**:225. 1910.

[9] LOTSY, J. P., Vorträge über botanische Stammesgeschichte, gehalten an der Reichsuniversität zu Leiden. Ein Lehrbuch der Pflanzensystematik. Dritter Band: Cormophyta Siphonogamia. Erster Teil. Imp. 8vo. pp. 1055. *figs. 661.* Jena: Gustav Fischer. 1911. *M* 30.

[10] WARMING, EUG., Handbuch der systematichen Botanik. Deutsche Ausgabe. Dritte Auflage, von Dr. MARTIN MÖBIUS. 8vo. pp. xii+506. *figs. 616.* Berlin: Gebrüder Borntraeger. 1911.

responsible for the vascular plants, giving rise directly and independently to three groups ("Filicineae, Lycopodineae, Equisetineae"), the first of which gives rise to the cycadophytes, while the lycopods produce the conifers and these in turn are responsible for the gnetums and the angiosperms. To the modern student of phylogeny this scheme is more interesting than appealing.—J. M. C.

Arm-chair science.—Sir RAY LANKESTER has brought together in book form a group of papers which he contributed to a London daily paper,[11] and which were addressed, of course, to the general public. It is a good illustration of the attitude of the man of science in England, as contrasted with the attitude of his colleagues in the United States. He wishes the public to know of the achievements of science, and this same spirit makes of the British Association a body of great popular interest. Of course "science from an easy chair" is not exact science, for it talks about subjects in an entertaining and suggestive way rather than about demonstrated facts. But still it is a fair question whether the arousing of interest in this way is not justified by the results.

It is of interest to note a zoologist's selection of botanical topics for such presentation. It is as follows: "A rival of the fabled upas tree" (which turns out to be *Rhus Toxicodendron*), "Poisons and stings of plants and animals," "The simplest living things," "The origin of opium," besides general biological topics that pertain to both animals and plants.—J. M. C.

NOTES FOR STUDENTS

Anatomy of Osmundaceae.—GWYNNE-VAUGHAN[12] has found the course of development of the stele in *Osmunda regalis*, *O. palustris*, and a species of *Todea* to correspond very closely to that already described for *Osmunda cinnamomea*. While the details in different individuals are variable, in general it may be said of all that the juvenile stage is long drawn out, and that at least the first pith formed is "stelar," that is, of intrastelar origin. The nodal pockets or parenchymatous pits in the medullary rays, characteristic of the Osmundaceae, are regarded as rather primitive organs and as having arisen independently of the pith. Perhaps the most interesting observation is the fact that some of the earlier leaf traces in *O. regalis* are mesarch. The main part of the paper is devoted to a discussion of the nature of the pith in the Osmundaceae. The author rightly hesitates to draw any far-reaching phylogenetic deductions from the phenomena observed in the sporeling, but prefers to rest his case, in favor of the view that the osmundaceous pith is stelar, on the fossils described by KIDSTON and GWYNNE-VAUGHAN. These fossils include protostelic ferns, in some of which the central tracheids are shorter than the outer ones, and

[11] LANKESTER, SIR RAY, Science from an easy chair. 8vo. pp. xiii+423. *pls. 2. figs. 82.* New York: Macmillan. 1911. $1.75.

[12] GWYNNE-VAUGHAN, D. T., Some remarks on the anatomy of the Osmundaceae. Ann. Botany **25**:525–536. *pl. 44. figs. 5.* 1911.